

OpenADR and AutoDR Program History and Implementation

Demand Response Measurement and Evaluation Committee
Workshop on Auto-DR Load Impact and Cost-Effectiveness
September 16, 2010

Sila Kiliccote and Mary Ann Piette
Lawrence Berkeley National Laboratory
Demand Response Research Center
<http://drrc.lbl.gov/>

Outline

- ❑ **What is AutoDR and OpenADR?**
- ❑ **Current OpenADR efforts**
- ❑ **Introduction to AutoDR**
 - Infrastructure, Programs and Deployments**
- ❑ **LBNL's observations**
- ❑ **Conclusion and Recommendations**

What is AutoDR and OpenADR ?

AutoDR

A technology infrastructure developed to meet State demand response policy goals from 2002:

- **Cost** - low-cost, automation infrastructure to improve DR in California
- **Technology** - Evaluate “readiness” of buildings to receive signals
- **Capability** - Evaluate capability of control strategies for buildings

OpenADR

An information exchange model to facilitate communication of price and reliability signals.

AutoDR programs offered by utilities or ISOs automate DR using **OpenADR**.

OpenADR-AutoDR CPUC Objectives

Assigned Commissioner ruling August 6, 2006 ordered IOU's to pursue three year AutoDR expanded implementation to facilitate non-utility industry participation and enhanced demand response capability.

- Implementation targets
- TA/TI limited term incentives to accelerate deployment.

CPUC OpenADR Objectives	Accomplishments
1. Accelerate the implementation of demand response.	<ul style="list-style-type: none">• 1MW 2006 to 25MW 2007• 25MW 2007 to 53.8 MW 2008
2. Expand OpenADR applications.	CPP, Demand Bid, Capacity Bid, Participating Load, Residential/Small Commercial CPP/DLC
3. Expand the role of aggregators and other industry resources to encourage non-utility deployment.	<ul style="list-style-type: none">• Approximately 50 control vendors• Honeywell Smart Grid Grant – 600 sites
4. Improve Demand Response performance	<ul style="list-style-type: none">• Consistent Load impacts• High Customer acceptance

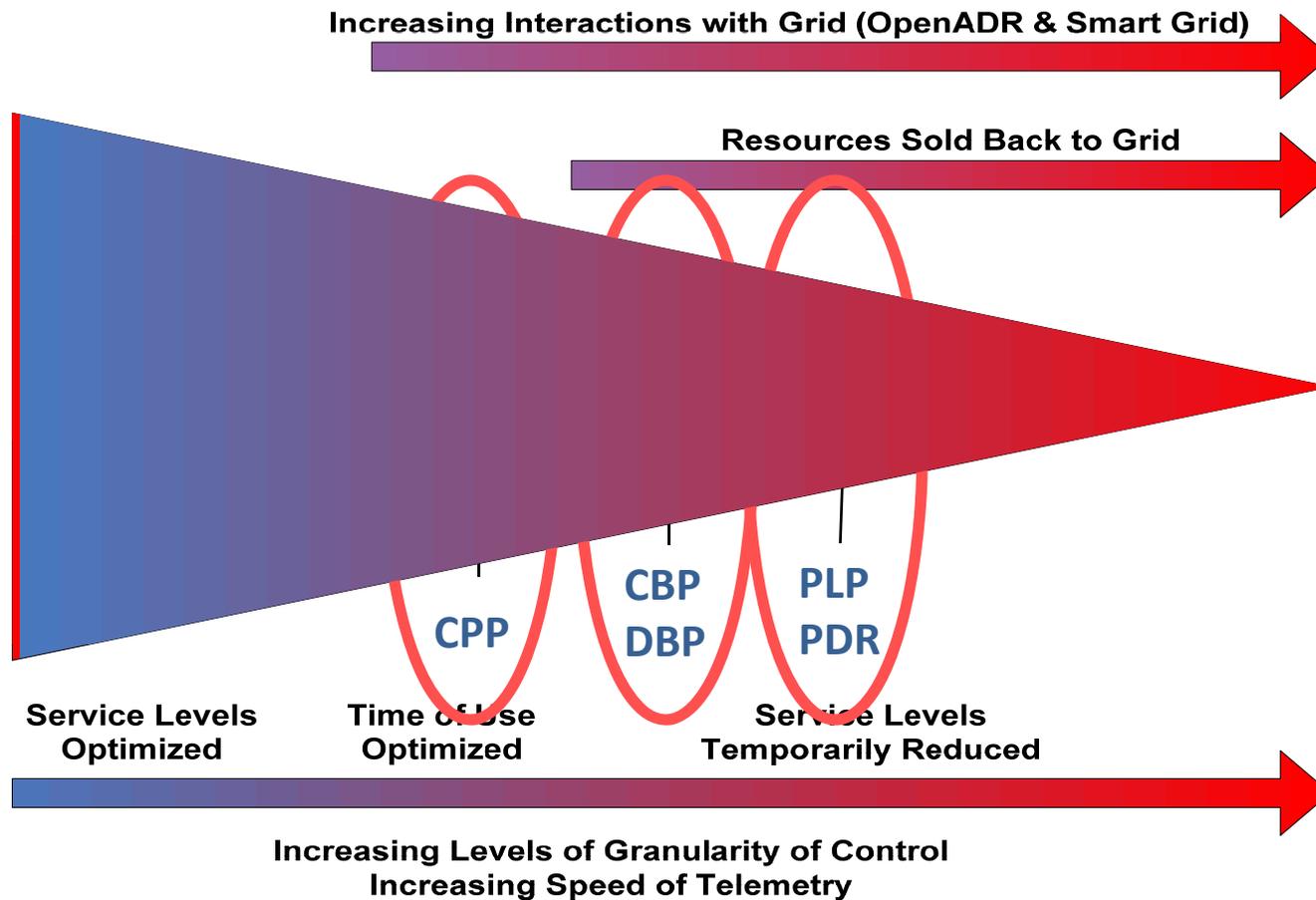
OpenADR - National Smart Grid Standard

- ❑ **OpenADR - one of the first 16 “Smart Grid Interoperability Standards” targeted to expedite development of a nationwide smart electric power grid.¹**
- ❑ **The Federal Energy Regulatory Commission (FERC) sited OpenADR as the only standard for DR signals in its recent “National Action Plan on Demand Response” report.²**

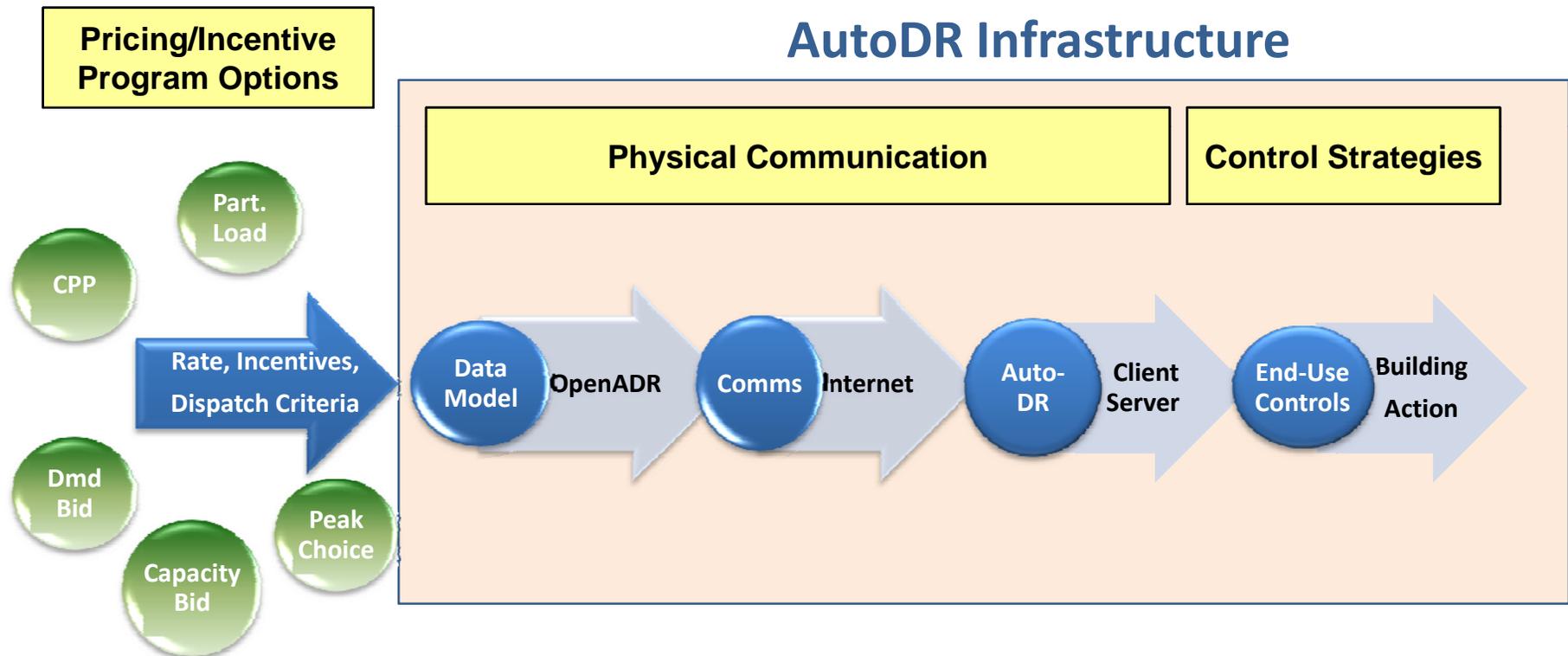
¹ See the DOE press release at www.energy.gov/news2009/7408.htm - May 2009

² See the FERC report at www.ferc.gov/legal/staff-reports/06-17-10-demand-response.pdf

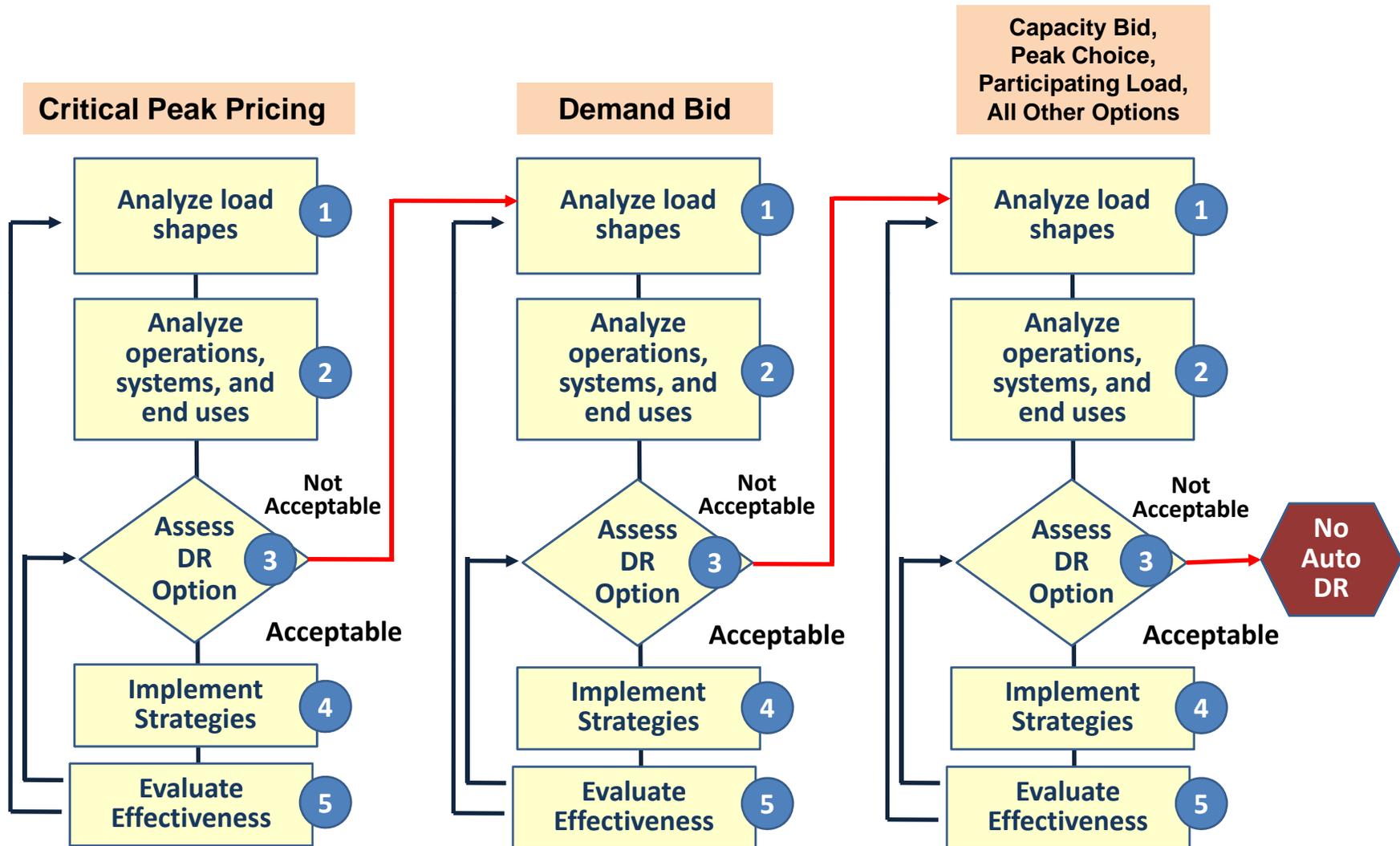
Demand Side Management AutoDR Applications



AutoDR Infrastructure Indifferent to Pricing or DR Programs

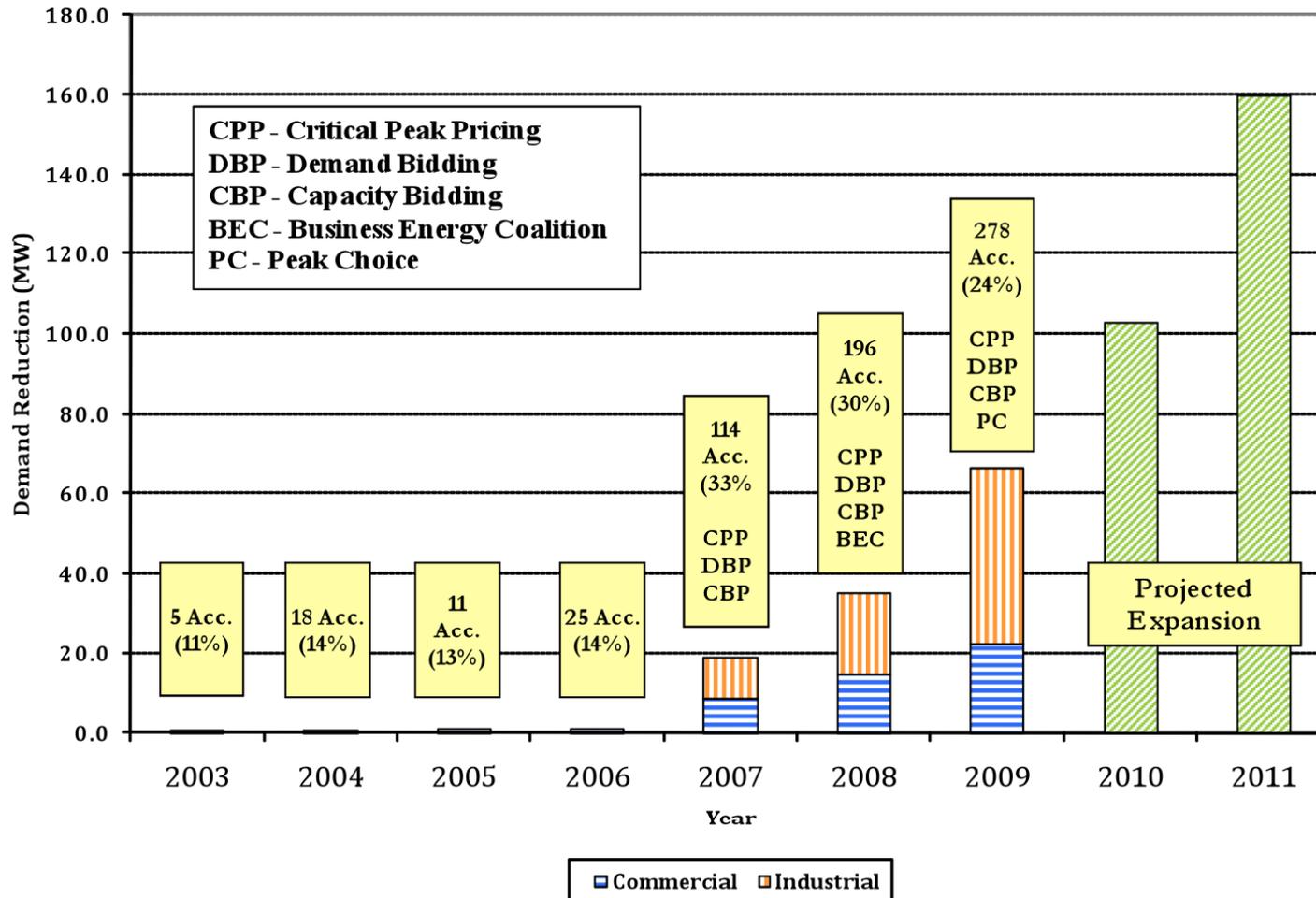


AutoDR Implementation Process Indifferent to Pricing / DR Programs

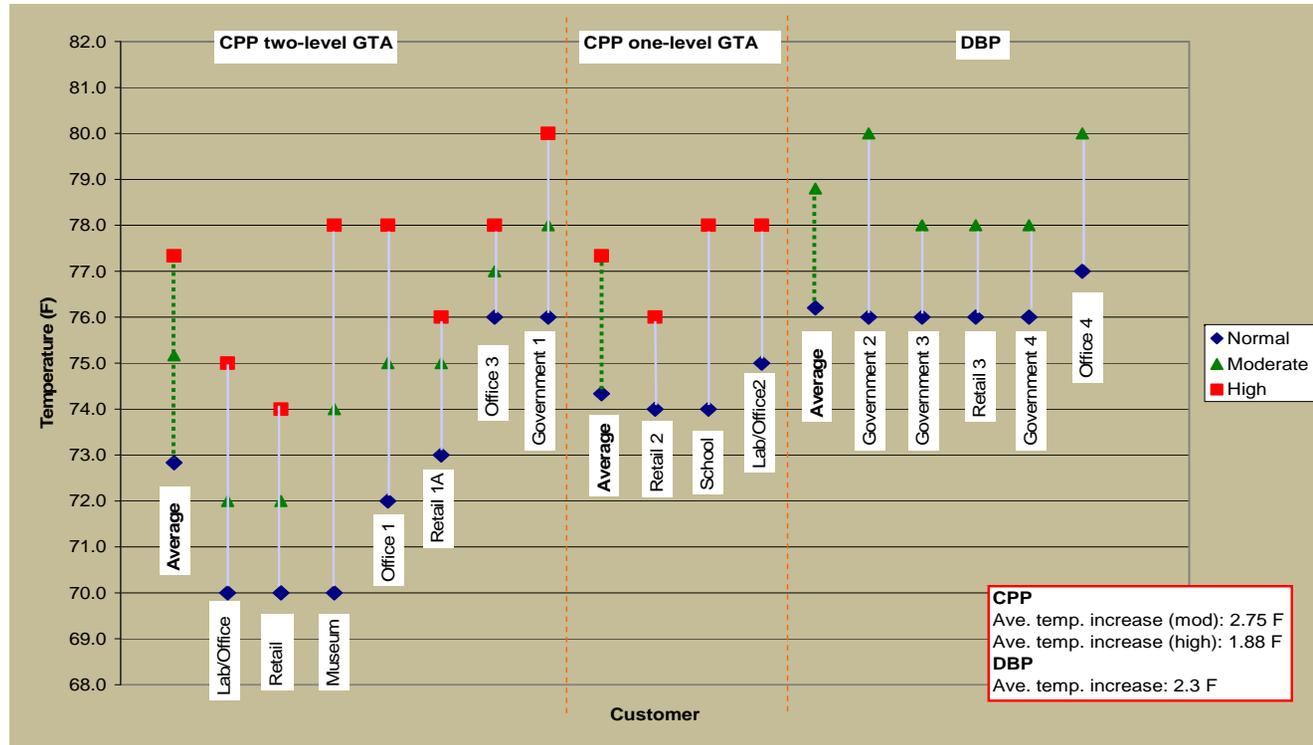


AutoDR Historical Performance

Fully Automated

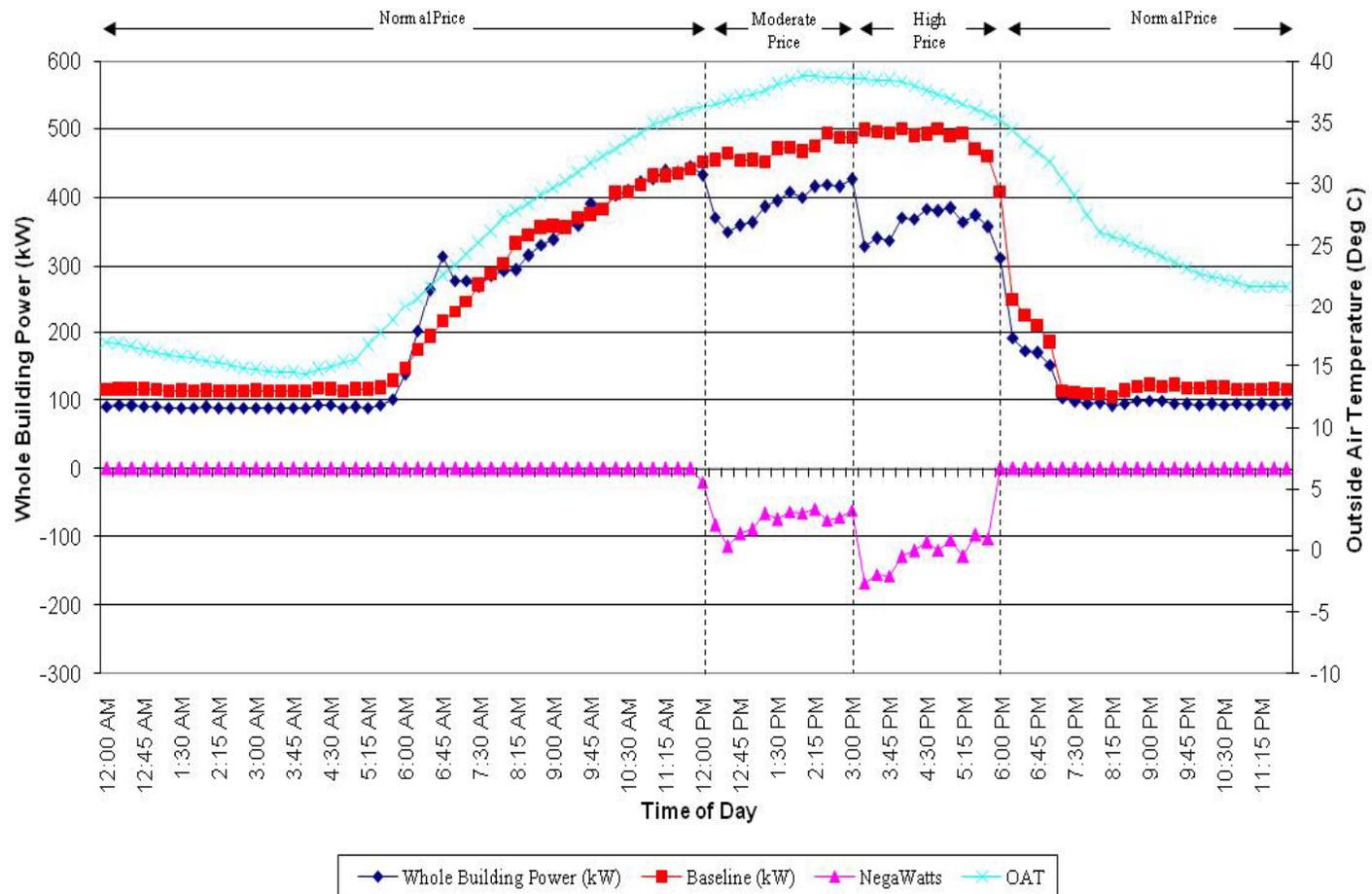


AutoDR Control Strategies – Fully Automated



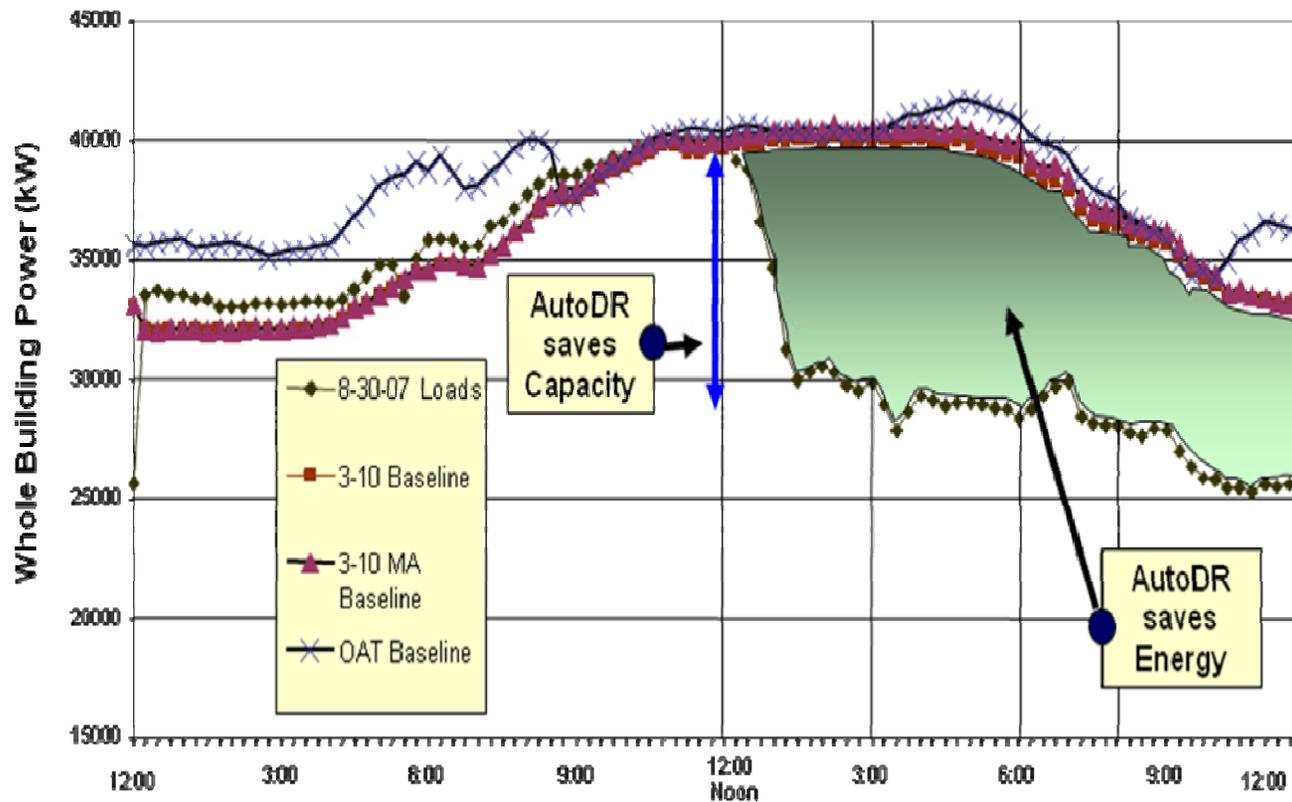
Load Shape Analysis Methods

Martinez, CA Office Building Electricity Use with and without AutoDR
June 21, 2006



AutoDR Saves Capacity & Energy

OpenADR Application Impacts PG&E Demand Bid Test Day (all participants)



AutoDR Implementation Experience

- ❑ AutoDR is a technology infrastructure supporting multiple programs and independent from programs.
 - ❑ Day-Ahead and Day-of
 - ❑ Ancillary Services (10 minute response time)
- ❑ AutoDR control strategies are pre-programmed. Customer response is fully automated.
- ❑ In some programs, enrollment is low, participation is diverse and the size of the customer impacts the performance of the program and statistical significance of the results.
- ❑ Focus on all types of customers (with and without high load impact).

Key Issues Captured in the Evaluation

1. Incentives overpaid

- A program design issue unrelated to AutoDR .
- Incentives not intended to be permanent.

2. Loads vary

- Load Impacts vary – Due to many factors such as, occupancy, economy, baselines, sample size and type, etc.

Conclusion

Attributes of AutoDR:

- **Communication infrastructure is low cost and the program takes on the cost of control systems installation and programming**
- **Flexible infrastructure to facilitate multiple DR programs and different timescales of response (day-ahead, day-of, now..)**
- **Provides customers choice and education**
- **Moving toward common practice:**
 - **supported building automation market transformation efforts**
 - **widely supported by controls vendors**
 - **long-term migration to Title 24 and LEED**
- **Gaining national and international support**
- **Industry leaders are forming OpenADR Alliance**

Recommendation

- 1. Migrate existing incentive structure toward more performance-based incentives.**
 - Based on better estimates**
 - Based on embedded rate or contractual provisions.**
 - Based on regular feedback**
- 2. Better define and integrate portfolio of demand response and rate options to provide customers with more clear cut choices – utilize OpenADR-AutoDR capability / investment.**

Thank you!

Sila Kiliccote

**Lawrence Berkeley National Laboratory
PIER Demand Response Research Center**

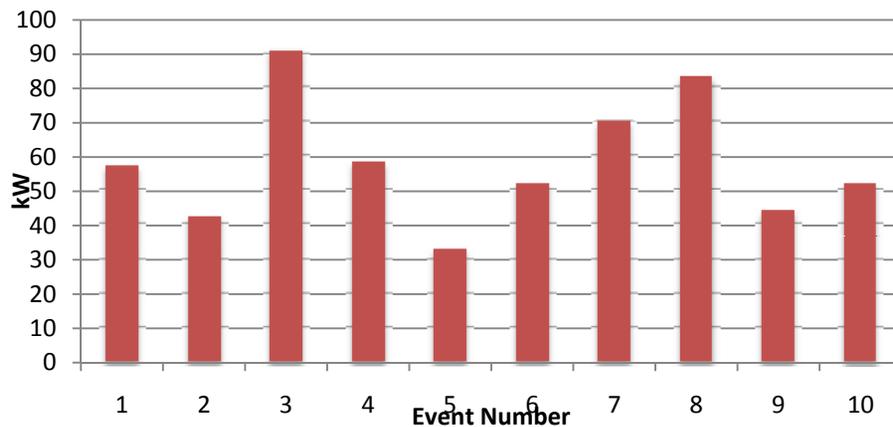
Skiliccote@lbl.gov

<http://drrc.lbl.gov>

Appendix – Supplementary Slides

AutoDR Analysis

Power Sheds for 10 DR Events

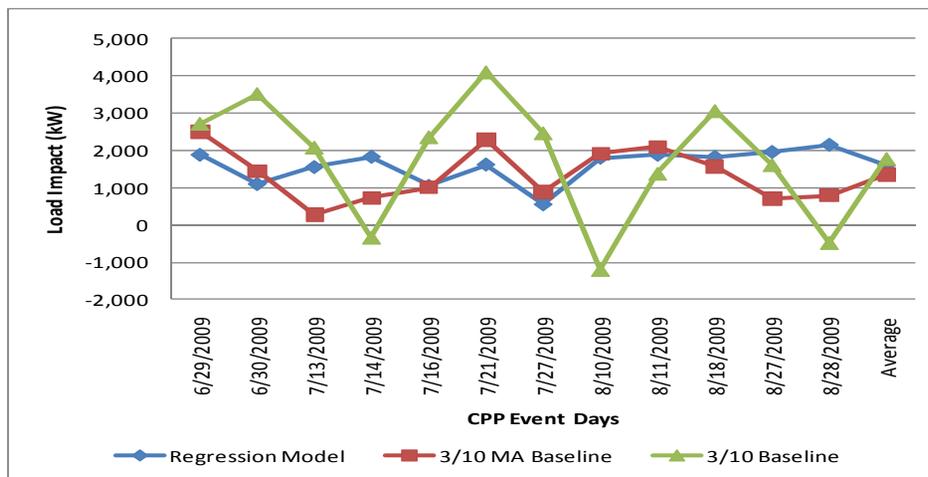


Characterize load in terms of weather sensitivity and load variability

Program design (e.g. voluntary) impacts participation

Samples in evaluation

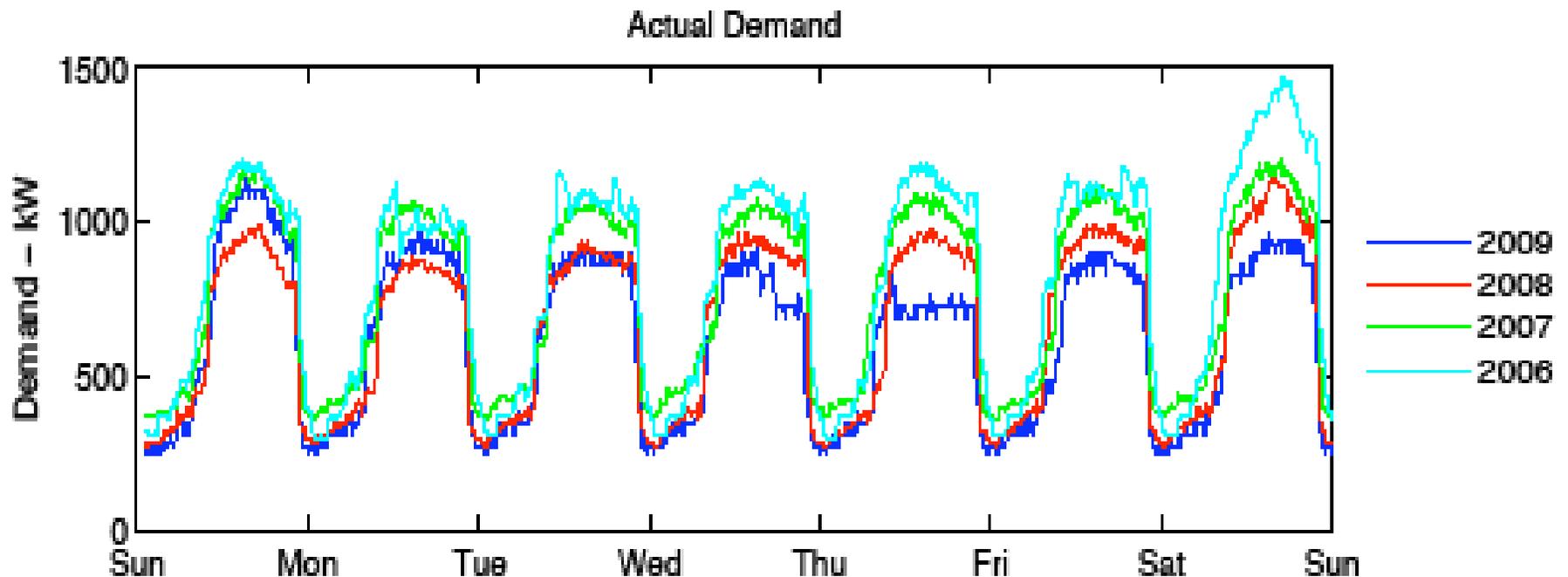
Baseline models



- Baseline models have error so all reduction estimates also have error.
- The more variable the building, the larger the baseline model error and the larger the error associated with the DR estimate.

AutoDR Evaluation Perspective IKEA East Palo Alto

- Participated in AutoDR CPP from 2006-2009.
- Efficiency and permanent DR improvements.
- Reduction in operating hours.
- Control strategies / automation basically unchanged.



Recommendations

Perform Auto-DR process evaluation

Migrate existing incentive structure towards more performance-based incentives

Working with IOUs to develop more efficient and accurate load estimation calculation methods

IOUs should consider providing performance feedback to participants

Work with IOUs and CEC to segment and prioritize participant type to optimize load impact or develop programs that facilitate the participation of certain type of participants

Increase AutoDR education and outreach to different stakeholder (account managers, facility managers, etc)

Better communicate value of participation in AutoDR program to customers

Better define market with dynamic tariffs, reliability programs and ancillary services